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The structure of adversarial growth in a sample of cancer patients 8 years post-diagnosis: a revision of the SLQ-38

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Stressful and traumatic events may trigger positive life changes, so-called adversarial growth. Despite growing interest in this topic, the structure and dimensionality of this concept has not been established. Recently, empirical reviews have suggested that the factors underlying this construct are highly related. Currently, the use of confirmatory factor analysis to test this hypothesis is advocated. Using data from cancer patients ($n = 206$), this study investigated the dimensionality of a Dutch translated version of the Silver Lining Questionnaire (SLQ-38). A 16-item SLQ (SLQ-16), with three subscales or first-order factors (enhanced personal relationships, changes in life philosophy and changes within the self) loading on a second-order general adversarial growth factor, was a good fitting model. In conclusion, the SLQ-16 may prove useful in the assessment of adversarial growth following illness.

Keywords: confirmatory factor analysis; adversarial growth; cancer; illness

Introduction

For many years, researchers have spent a great deal of time and effort investigating the occurrence of growth following adversity, trauma and illness (see Helgeson, Reynolds, & Tomich, 2006; Linley & Joseph, 2004, for reviews). It has been established that dealing with highly stressful and traumatic events, such as cancer (Schroevers, Ranchor, & Sanderman, 2006), rape (Frazier & Burnett, 1994) and bereavement (Lehman et al., 1993), can lead to positive life changes, including enhanced personal relationships, personal changes within the self and changes in life philosophy (Bellizzi & Blank, 2006; Joseph & Linley, 2006).

A variety of different labels have been created to refer to the positive events experienced by survivors of adversity or trauma including *posttraumatic growth* (Tedeschi & Calhoun, 1996), *benefit finding* (Affleck & Tennen, 1996), *stress-related growth* (Park, Cohen, & Murch, 1996), *positive consequences* (Sodergren & Hyland, 2000), *positive changes* (Collins, Taylor, & Skokan, 1990), *finding meaning* (Folkman, 1997) and *adversarial growth* (Linley & Joseph, 2004). Throughout this article, we have opted to consistently use the term adversarial growth (Linley & Joseph, 2004) to refer to the positive changes experienced by a sample of cancer survivors as a result of struggling with adversity.

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Given the fact that numerous labels have emerged to describe adversarial growth, it is not surprising that a host of different instruments have been designed to measure this phenomenon (see Helgeson et al., 2006, for a review). Several questionnaires have been designed to measure positive changes following various stressful life events. Moreover, these 'generic' instruments can also be modified to focus on a specific event. Two well-known questionnaires of this type are the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) and the Stress-Related Growth Scale (SRGS; Park et al., 1996). In addition, other instruments have been designed to specifically measure the occurrence of adversarial growth following illness. Examples of these instruments include the Benefit Finding in Multiple Sclerosis Scale (BiFMSS; Pakenham & Cox, in press) and the Silver Lining Questionnaire (SLQ-38; Sodergren & Hyland, 2000). Although the advantages of using a generic scale may appear obvious (e.g. increase in the comparability of findings between studies), the major disadvantage with this type of instrument is that some of the questionnaire items may not be relevant to the experience of living with illness (Ho, Chan, & Ho, 2004). Thus, despite suggestions that generic instruments can assess for the occurrence of adversarial growth following any stressful event (Tedeschi & Calhoun, 1996), it would appear that there is a need for a comprehensive and psychometrically sound instrument that can measure specific aspects of adversarial growth following illness.

It is clearly evident from the proliferation of terminology and the increasing number of instruments purporting to measure growth that interest in this phenomenon is growing. Nevertheless, it also makes it more difficult to integrate and synthesise theoretical and empirical work (Joseph, Linley, & Harris, 2005; Lechner et al., 2003; Thornton, 2002). One of the main conceptual concerns is whether growth is a *multidimensional* or a *unidimensional* construct. In other words, it is better to distinguish multiple domains of growth or can growth best be measured by an overall, single perception of positive change? Thornton (2002) noted that the dimensionality of growth seems to depend on the measuring instrument that is used. For example, Tedeschi and Calhoun (1996) defined the concept of posttraumatic growth as multi-faceted, consisting of five distinct psychological changes: new possibilities, relating to others, personal strength, spiritual changes and appreciation of life. Thus, the instrument developed by these authors, the PTGI, assesses for these five constructs. Alternatively, Park et al. (1996) concluded that having conducted factor analysis on participants' responses to the SRGS, adversarial growth is best captured by a single dimension. Conflicting findings pertaining to the dimensionality of adversarial growth are due in part to the fact that investigators themselves typically determine the items of the scale, which largely depend on their own specific conceptualizations of adversarial growth (Joseph et al., 2005; Park & Lechner, 2006). Inconsistencies regarding the dimensionality of adversarial growth following illness are also evident (Pakenham & Cox, in press), although much less research has been conducted in this area.

An additional problem that may contribute to the conflicting evidence on the dimensionality of growth relates to the fact that a variety of statistical techniques have been used to assess the dimensionalities of the various self-report instruments. In particular, many researchers have relied on principal components analysis (PCA) when investigating the factor structure of specific instruments (e.g. PTGI and SRGS). Use of this procedure may have led to spurious results relating to the dimensionality of adversarial growth because it is widely recognised that when establishing the factor structure of an instrument, it is more appropriate to conduct exploratory factor analysis (EFA) and to subsequently verify the derived model using confirmatory factor analysis (CFA; Tabachnick & Fidell, 2001). Indeed, the use of rigorous methodologies and rich conceptual models to further investigate the construct of adversarial growth has been

advocated (Park & Helgeson, 2006). Following these recommendations, McBride, Dunwoody, Lowe-Strong, and Kennedy (in press) focused on assessing the factor structure of the SLQ-38 (Sodergren & Hyland, 2000) in a heterogeneous sample of individuals with multiple sclerosis (MS; 46%), cancer (18%), cardiac disease (18%) and renal disease (18%). The results demonstrated that the 38-item instrument was not measuring a uni-dimensional construct; however, 24 of the items appeared to measure five underlying constructs of adversarial growth.

A related issue pertaining to the aforementioned arguments is that the factor structure of adversarial growth might vary as a function of the characteristics of the respondent population (e.g. students, illness groups, ethnic minorities, etc.) or the types of traumatic or stressful event experienced (e.g. bereavement, illness, etc.) (Cohen, Cimbolic, Armeli, & Hettler, 1998; Hiskey, Troop, & Joseph, 2006; McMillen & Fisher, 1998; Park & Lechner, 2006). Empirical evidence in support of these assertions derives from recent studies that have failed to replicate the original five-factor structure of the PTGI (Tedeschi & Calhoun, 1996) using data from university students (Linley, Andrews, & Joseph, 2007; Maercker & Langer, 2001), adults with cardiovascular disease (Sheikh & Marotta, 2005), Chinese cancer patients (Ho et al., 2004), Bosnian refugees (Powell, Rosner, Butollo, Tedeschi, & Calhoun, 2003) and Latina immigrants (Weiss & Berger, 2006). Indeed, it may be the case that differences in the sample and/or type of stressful event experienced, coupled with cultural differences, could help to explain the emergence of different dimensions of growth across studies.

Recently, several researchers have made endeavours to overcome the different methodological and conceptual issues. In an attempt to clarify the dimensionality of growth, Joseph et al. (2005) demonstrated that adversarial growth could best be described as three connected themes (enhanced personal relationships, personal changes within the self and changes in life philosophy) that related to a higher order construct of general adversarial growth. In other words, this viewpoint suggests that practitioners and clinicians can consider the phenomenon of adversarial growth in relation to these three main dimensions and that these dimensions combine to give an overall or general measurement of the adversarial growth experienced by a particular individual.

In light of emerging evidence that further research is required to assess the dimensionality of growth, taking into account the specific nature of the experience, the major aim of the current study was further examining the dimensionality of the SLQ-38 (Sodergren & Hyland, 2000). Specifically, the current study extended a recent investigation (McBride et al., in press) by conducting analysis on data from a sample of cancer patients who had completed a Dutch version of the SLQ-38 eight years post-diagnosis. Owing to the fact that the two samples differed in relation to diagnosis, the current study investigated whether a different factor structure for the SLQ-38 would emerge using a more homogeneous sample. To achieve this aim, CFA was used to test alternative factor models of adversarial growth. Specifically, a one-factor model for the original SLQ-38 was specified, consistent with the Sodergren and Hyland (2000) conceptualisation of the scale. Secondly, the current study tested the five-factor model proposed by McBride et al. (in press), investigating whether 24 of the SLQ-38 items relate to five underlying factors. Finally, in light of the fact that research strongly suggests that the structure of adversarial growth can best be conceptualised as a second-order factor model, with three interrelated themes, (Joseph et al., 2005), the current study also investigated whether a selection of the SLQ-38 items could relate to this factor structure. This process involved examining the content of the SLQ-38 items and identifying those items that correspond to the themes of changes in life philosophy, changes within the self, and improved relationships.

Goodness-of-fit indices were obtained for each model to determine which, if any, of the a priori structures provided the best fit to the data.

A secondary aim of the current study was to investigate whether the reporting of adversarial growth following illness was related to socio-demographic or illness-related variables. This analysis was exploratory in nature because previous research in this area has failed to produce consistent findings (Bellizzi & Blank, 2006; Curbow, Legro, Baker, Wingard, & Somerfield, 1993). For example, it has been reported that females tend to report experiencing higher levels of adversarial growth following illness than males (Jaarsma, Pool, Sanderman, & Ranchor, 2006); however, other studies have found no empirical evidence for gender differences (Ho et al., 2004; Pakenham & Cox, in press; Petrie, Buick, Weinman & Booth, 1999). Inconsistent findings in relation to age have also been found. For instance, it has been proposed that younger people are more likely to report adversarial growth than their older counterparts (Evers et al., 2001); however, evidence to the contrary has also been reported (Northouse, 1994; Pakenham & Cox, in press). In relation to illness-specific variables, research has demonstrated that different levels of adversarial growth can occur across illness groups (Katz, Flasher, Cacciapaglia, & Nelson, 2001; McBride et al., in press; Petrie et al., 1999). To date, few studies have investigated the impact of socio-demographic or illness-related factors on the reporting of adversarial growth across different cancer groups. This being noted however, previous research has demonstrated that more advanced stages of the disease (e.g. Stage II compared to Stage I) are often associated with higher levels of growth (Lechner et al., 2003; Tomich & Helgeson, 2004). The current study extends previous research by using multivariate analysis of variance to examine the effects of key socio-demographic and illness-related variables on the occurrence of adversarial growth following illness.

Method

Participants and procedure

The data used for the present study were part of a larger longitudinal study on predictors of long-term adjustment to cancer (see Schroevers et al., 2006, for details). A large group of cancer patients and healthy references were assessed at several points in time. For the present analyses, we only included the 206 cancer patients that participated at the last assessment (8 years post-diagnosis). A comparison between patients who participated at the follow-up ($n = 206$) and those who dropped out since the first assessment ($n = 269$) showed that the latter group was significantly more often diagnosed with colorectal or lung cancer, stage III or IV, treated with radiotherapy or chemotherapy, and older, more often male, and lower educated ($p < 0.01$).

The demographic characteristics of the current sample are outlined in Table 1. The participants ranged in age from 23 to 82 years (M = 54 years; SD = 13.6). The majority of the participants were female, living with a partner, had a low level of education, and were diagnosed with breast cancer, cancer stage I, with surgery as their primary source of treatment. Of the 206 cancer patients, 155 remained disease-free throughout the 8-year period and 38 developed a cancer recurrence (no information was available for 13 patients).

Instrument

Silver Lining Questionnaire (SLQ-38; Sodergren & Hyland, 2000)

Individuals are asked to think about the positive aspects of their illness experience and to indicate the extent to which they agree with the 38 statements using a five-point Likert

Table 1. Demographic characteristics of sample at 8 years after diagnosis ($n = 206$).

	Cancer survivors (%)
Gender (female)	79
Marital status (having a partner)	74
Education	
Primary	31
Lower vocational/secondary	43
Middle vocational/secondary	15
Higher vocational/university	11
Cancer site	
Breast	53
Colorectal	22
Gynaecological	19
Lung	4
Other	2
Stage	
I	49
II	42
III–IV	9
Initial treatment	
Only surgery	48
Surgery and radiotherapy	22
Surgery and chemotherapy	9
Surgery, radio- and chemotherapy	9
Other	12

scale ranging from (1) strongly disagree to (5) strongly agree. A validated Dutch translation of the questionnaire was used. Sodergren, Hyland, Singh and Sewell (2002) advocated dichotomous scoring whereby a value of 1 was assigned to responses of strongly agree and agree, whereas all the other response options received a value of 0. The current study used the polytomous scoring procedure. Research has demonstrated that this method makes factor analysis more feasible and these items are more reliable, and have greater variance, compared to dichotomous items (Tabachnick & Fidell, 2001).

Data preparation

Complete data on the SLQ-38 items were available for 199 participants and missing data were dealt with using the EM algorithm. The EM algorithm, which performs maximum likelihood parameter estimation under the missing-at-random assumption, has been demonstrated to be an effective method of dealing with missing data (Bunting, Adamson & Mulhall, 2002). Using this approach, the total sample consisted of 206 participants.

Statistical analyses

Initially, a one-factor model with all 38 items loading on a single adversarial growth factor was specified (Figure 1). This model was consistent with the Sodergren and Hyland (2000) conceptualisation of the scale. Secondly, a five-factor model, as

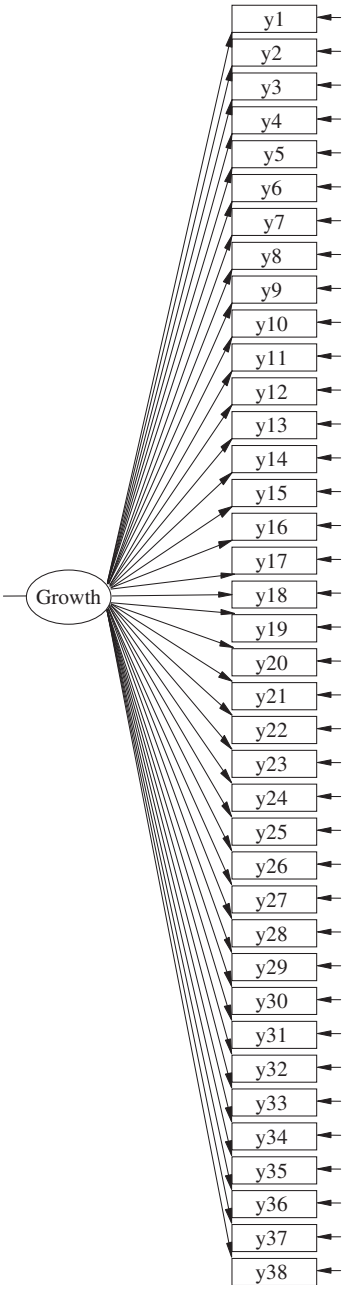

Figure 1. One-factor model (SLQ-38). Growth = Adversarial growth.

proposed by McBride et al. (in press), was tested to investigate whether 24 of the SLQ-38 items related to five underlying factors in the current sample (Figure 2). The 24 items were specified to load onto five factors in the following manner: Factor 1: improved personal relationships (items 13, 16, 25, 26, 28 and 33); Factor 2: greater appreciation for life (items 2, 3, 4, 10 and 15); Factor 3: positive influence on others

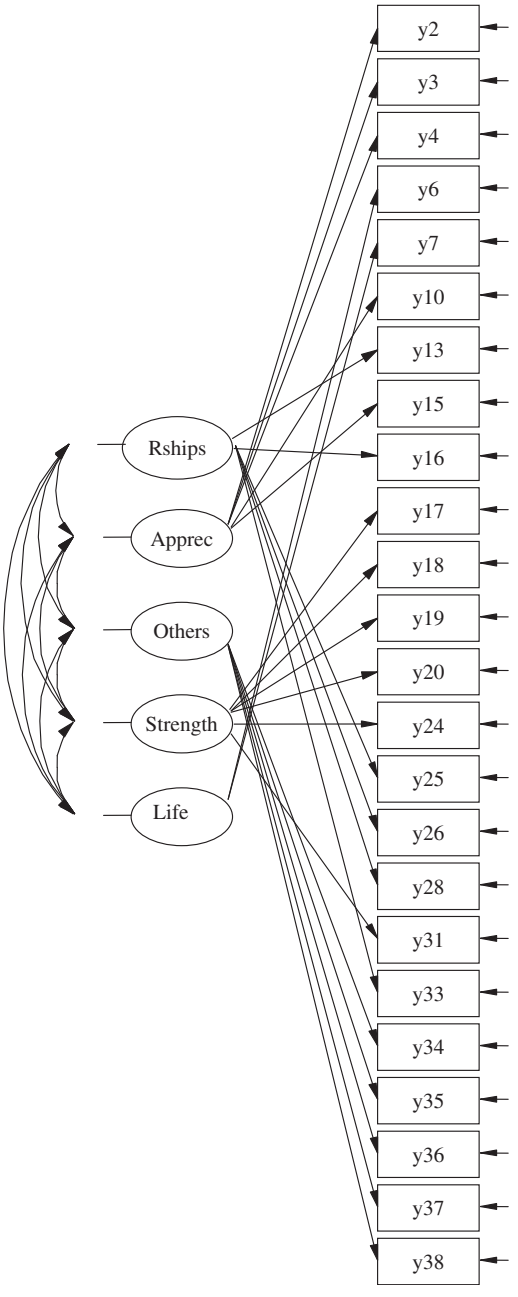

Figure 2. Five-factor model (SLQ-24). Life = changes in life philosophy; Strength = personal inner strength; Others = positive influence on others; Apprec = greater appreciation for life; Rships = improved personal relationships.

(items 34, 35, 36, 37 and 38); Factor 4: personal inner strength (items 17, 18, 19, 20, 24 and 31) and Factor 5: changes in life philosophy (items 6 and 7).

Finally, in light of the fact that research strongly suggests that the structure of adversarial growth can best be conceptualised as a second-order factor model, with three

interrelated themes of changes in life philosophy, changes within the self, and improved relationships (Joseph & Linley, 2006; Joseph et al., 2005), the current study investigated whether a selection of the SLQ-38 items could relate to this factor structure. Presently, there is no standard definition on what constitutes growth to help guide item selection for measurement development (Joseph et al., 2005); thus, the authors examined the content of the SLQ-38 items to identify those that appeared to correspond to the three themes of changes in life philosophy, changes within the self, and improved relationships. Joseph and Linley (2006) described enhanced relationships as people valuing their friends and family more, and feeling an increased compassion and altruism towards others. It appeared that items 25, 27, 28, 33, 35 and 38 of the SLQ-38 appeared to reflect this theme. Similarly, changes within the self were described as an individual having a greater sense of personal resilience, wisdom and strength in addition to having a greater awareness of personal vulnerabilities and limitations (Joseph & Linley, 2006). Items 15, 18, 20, 22 and 31 of the SLQ-38 were thought to tap into this concept. Finally, changes in life philosophy were recognised as finding new appreciation for each day, renegotiating what really matters in life, coupled with changes in spiritual beliefs (Joseph & Linley, 2006); the authors believed that items 1, 2, 4, 6 and 7 of the SLQ-38 reflected this concept. In total, 16 items were selected to measure the three basis dimensions of growth. These three first-order factors were specified to load on a single second-order adversarial growth factor (Figure 3). Using LISREL 8.72 (Jöreskog & Sörbom, 2005), fit indices were obtained for each model to determine the goodness-of-fit for each of the models.

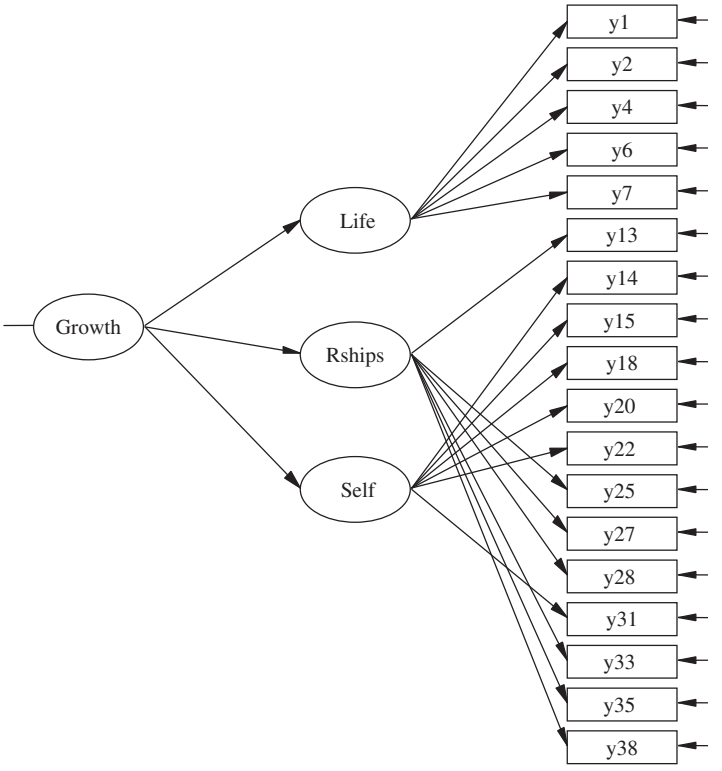

Figure 3. Three-factor model (second-order factor model: (SLQ-16). Growth = Adversarial growth; Self = changes within the self; Rships = changes in personal relationships; Life = changes in life philosophy.

According to the guidelines proposed by Hoyle and Panter (1995), a number of indices were used to determine the adequacy of the model fit to the data: the goodness-of-fit index (GFI; Jöreskog & Sörbom, 1981), the incremental fit index (IFI; Bollen, 1989) and the comparative fit index (CFI; Bentler, 1990). Values >0.90 for the GFI, IFI and CFI are considered to reflect good model fit, and values between 0.85 and 0.90 reflect moderate model fit (Jöreskog & Sörbom, 1993). In addition, the root-mean-square error of approximation (RMSEA; Steiger, 1990) was reported with 90% confidence intervals, for which a value of <0.05 indicates good model fit and values of up to 0.08 are indicative of acceptable model fit (Browne & Cudeck, 1993). Finally, the expected cross validation index (ECVI; Browne & Cudeck, 1993) was used to assess the comparative fit across the models, with the smallest value reflecting the best model fit to the data.

Results

Confirmatory factor analysis

The three alternative CFA models are presented in Figures 1–3. The figures use the conventions of path diagrams where the factors are represented as circles. The items (y_1–y_{38}) or observed scores are represented as boxes. The unique variances or measurement error for each item are represented as small arrows attached to each box. The arrows linking the factors and the items are factor loadings. The curved arrows between factors represent factor correlations (Andrews, Shevlin, Troop, & Joseph, 2004). Table 2 displays the fit indices for the three CFA models.

The values for the RMSEA and the GFI indicated that the one-factor model was a complete inadequate fit to the data. In other words, the items of the SLQ-38 cannot be described as tapping into a single underlying dimension. The five-factor model had lower RMSEA and ECVI values compared to the one-factor model, suggesting that the former model was a slightly better fit to the data. Nevertheless, the value for the GFI (0.82) was lower than recommended.

The second-order factor model had the lowest RMSEA and ECVI values, and the highest GFI value, of all three models. This result suggested that this was the best-fitting model and although it did not provide a perfect fit to the data, the fit was reasonable and acceptable. Moreover, the second-order factor model had the fewest parameters (hence higher degrees of freedom) and so should be preferred on the basis of parsimony. The adequacy of this model must also be considered in terms of the parameter estimates: all of the first-order factor loadings (Table 3) are moderate, positive and statistically significant ranging from 0.52 to 0.89. This result reveals that all of the items are good indicators of their respective factors. These results provide support for the notion put

Table 2. Fit indices for the three- factor analytic models of the Silver Lining Questionnaire.

	χ^2	df	RMSEA	90% CI	ECVI	IFI	CFI	GFI
One-factor model	1723.05	665	0.101	0.095–0.110	10.65	0.97	0.97	0.66
Three-factor model	188.40	101	0.065	0.050–0.079	1.26	0.98	0.98	0.90
Five-factor model	526.67	242	0.075	0.066–0.084	3.11	0.98	0.98	0.82

Notes: RMSEA = root-mean-square error of approximation; CI = confidence intervals; ECVI = expected cross validation index; IFI = incremental fit index; CFI = comparative fit index; GFI = goodness-of-fit index.

Table 3. Completely standardized factor loadings from the three alternative models of the Silver Lining Questionnaire.

	SLQ-38	SLQ-24					SLQ-16		
SLQ-38 item	F1	F1	F2	F3	F4	F5	F1	F2	F3
1. I appreciate life more because of my illness	0.60						0.78		
2. My illness gave me a new start in life	0.65		0.74				0.74		
3. My life is much better now than it was before my illness	0.65		0.72						
4. My illness has made me live life to its fullest	0.67		0.73				0.79		
5. Because of my illness I find it easier to accept what life has in store	0.75								
6. My illness made me think about the true purpose of life	0.71					0.75	0.78		
7. My religious/spiritual beliefs deepened because of my illness	0.52					0.55	0.52		
8. I am now more open to other religions because of my illness	0.48								
9. My illness made me a better person	0.65								
10. I became a happier person because of my illness	0.70		0.77						
11. I am a calmer person because of my illness	0.74								
12. My illness made me more mature	0.69								
13. My illness made me a more tolerant person	0.63	0.63							
14. My illness made me realise that I matter as a person	0.73								
15. My illness gave me more confidence	0.79		0.79						0.79
16. I am less concerned about failure because of my illness	0.73	0.74							
17. My illness gave me permission to do things for myself	0.79			0.82					
18. My illness made me a more determined person	0.83		0.88						0.88
19. My illness helped me find myself	0.82		0.83						
20. My illness made me more aware of my strengths	0.86		0.89						0.89
21. Through my illness I discovered a talent I didn't know I had	0.71								
22. I can face whatever is around the corner because of my illness	0.68								0.68
23. My illness encouraged me to reflect on how I feel about myself	0.77								
24. My illness made me face up to problem areas of my life	0.69		0.69						
25. My illness strengthened my illness with others	0.73	0.74						0.75	
26. My illness made me less concerned with the approval of others	0.63	0.64							
27. Because of my illness I have more to offer other people	0.76							0.77	
28. My illness made me more at ease with others	0.77	0.75						0.77	

(*continued*)

Table 3. Continued.

SLQ-38 item	SLQ-38	SLQ-24					SLQ-16		
	F1	F1	F2	F3	F4	F5	F1	F2	F3
29. I see others in their true colours because of my illness	0.74								
30. My illness gave me the opportunity to meet new people	0.61								
31. My illness taught me how to stand up for myself	0.71				0.74				0.75
32. My illness made me put an end to troublesome relationships	0.66								
33. My illness made me less judgemental of others	0.55	0.54						0.57	
34. I have been an inspiration to others	0.69			0.71					
35. People can be more open with me since my illness	0.66			0.76				0.71	
36. My illness changed other people for the better	0.70			0.80					
37. My illness changed other people's perception of me for the better	0.71			0.82					
38. Other people appreciate me more because of my illness	0.61			0.67				0.62	

Notes: SLQ-38: F1 = adversarial growth, SLQ-24: F1 = improved personal relationships, F2 = greater appreciation for life, F3 = positive influence on others, F4 = personal inner strength, F5 = changes in life philosophy. SLQ-16: F1 = changes in life philosophy, F2 = enhanced relationships, F3 = changes within the self.

forward by Joseph et al. (2005) that three factor or dimensions (i.e. changes in life philosophy, changes within the self, and improved relationships) tap into different aspects of a more general underlying concept labelled as general adversarial growth.

The second-order factor loadings are displayed in Table 4 and are high, positive and statistically significant, ranging from 0.81 to 0.98. The role of the second-order factor is primarily to account for the variance and covariance in the first-order factors (Marsh, 1985). In the current investigation, the second-order factor accounted for 66% of the variance of the changes in life philosophy factor, 95% of the variance of the changes within the self-factor and 88% of the variance of the enhanced relationships factor. These findings suggest that the second-order factor (adversarial growth) is well defined and is able to explain a substantial proportion of the variation and covariation among the first-order factors. Pearson's correlations were calculated between the three SLQ-16 subscales and total scale score and these results are presented in Table 5. All of the correlations are positive, moderate to strong, and statistically significant. This finding indicates that although the first-order factors were related and appeared to overlap to a certain degree, each one made a separate contribution to the construct of adversarial growth in illness.

Reliability analysis

Reliability analysis indicated acceptable internal consistency for all of the three factors. Specifically, the α values were 0.83, 0.90 and 0.85 for the changes in life philosophy, changes within the self, and enhanced relationships factors, respectively.

Table 4. Second-order factor loadings from the second-order factor model of the Silver Lining Questionnaire.

First-order factor	Second-order factor – general adversarial growth
Changes in life philosophy	0.81*
Changes within the self	0.94*
Enhanced relationships	0.98*

Note: *$p < 0.05$.

Table 5. Correlations between first- and second-order factors of the SLQ-16.

	F1	F2	F3	SOF 'General adversarial growth'
F1 Changes in life philosophy	–			
F2 Enhanced relationships	0.658	–		
F3 Changes within the self	0.669	0.744	–	
SOF 'General adversarial growth'	0.861	0.889	0.903	–

Notes: SOF = second-order factor. All correlations are significant at $p < 0.001$ level.

Relationships between scores on the SLQ-16 and demographic/illness variables

A final set of analysis involved investigating whether subscale or total scores on the SLQ-16 varied as a function of socio-demographic (gender, age, education and marital status) or illness-related (type of cancer, stage of cancer, recurrence of disease, and treatment received) variables. Scores were calculated for each subscale and the total SLQ-16 (general adversarial growth). Using the Likert scale mentioned above, the changes in life philosophy and the changes within the self scales has a possible range of 5–25, the enhanced relationships subscale had a range of 6–30, and the total SLQ-16 (general adversarial growth) had a range of between 16 and 80. Preliminary analysis revealed the following means and SDs: changes in life philosophy ($M = 16.33$; $SD = 5.37$); enhanced relationships ($M = 17.28$; $SD = 5.67$); changes with the self ($M = 14.09$; $SD = 5.49$); and total SLQ-16 score ($M = 47.71$; $SD = 14.96$). Thus, the current sample achieved ~60% of the maximum score on general adversarial growth.

Pearson's correlations between the socio-demographic and illness-related variables and the factors revealed weak but significant associations for stage of cancer and scores on the enhanced relationships ($r = 0.171$; $p < 0.05$) and the changes within the self ($r = 0.143$; $p < 0.05$) factors. Age was negatively associated with scores on the changes in life philosophy ($r = -0.209$; $p < 0.01$), the changes within the self ($r = -0.193$; $p < 0.01$), and the general adversarial growth ($r = -0.186$; $p < 0.01$) factors.

Finally, separate multivariate analysis of variance (MANOVA) were conducted for each of the socio-demographic and illness-related variables using the scores from the three subscales score as dependent variables. The results from the MANOVA revealed significant main effects for type of cancer [$F(12, 526) = 1.822$, $p = 0.42$; Wilk's $\Lambda = 0.898$; partial $\eta^2 = 0.035$] and stage of cancer [$F(6, 402) = 2.195$, $p = 0.43$; Wilk's $\Lambda = 0.938$; partial $\eta^2 = 0.032$]. Subsequently, two separate analyses of variance (ANOVAs) were conducted as follow-up tests to the MANOVA. Using the Holms Bonferroni procedure to control for Type I errors (i.e. $p = 0.025; 0.05/2$), neither main effect remained significant.

Finally, an ANOVA was conducted between the total scores on the SLQ-16 (general adversarial growth) and the socio-demographic and illness-related variables. None of the results were significant ($p > 0.05$). Thus, mean scores on the three first-order factors, or the second-order factors, did not significantly vary as a function of socio-demographic or illness-related variables.

Discussion

The current study examined the structure of adversarial growth, as measured by a Dutch translation of the SLQ-38, in a sample of cancer patients 8 years post-diagnosis. A number of important findings warrant discussion. Firstly, consistent with previous research, the results demonstrated that the SLQ-38 items could not be described as measuring a single underlying dimension of adversarial growth. Moreover, although the results suggested that the five-factor model proposed by McBride et al. (in press) was a superior fit to the one-factor model, it also provided an inadequate fit to the data. There are several plausible reasons for this latter finding. For example, the participants in the current study were a relatively homogeneous group of mostly female cancer patients whereas McBride and coworkers collected data from a relatively heterogeneous sample, of which MS patients represented 46%. The differences between the samples may have affected the fit of the model because it has been acknowledged that individuals with MS often have a different illness experience even when compared to other individuals living with illnesses of similar physical disability (Schubert & Foliart, 1993). Thus, the five-factor structure that emerged in the study by McBride and coworkers may reflect the illness experience of the more dominant illness group (i.e. the MS sufferers) in that study and thus may not have provided an adequate fit to the data in the current study. In addition, the differences in time since diagnosis could have impacted on the findings between the two studies. Although some studies have reported that positive change following illness was unrelated to time since diagnosis (Dirksen, 1995; Thompson & Pitts, 1993), Joseph et al. (2005) noted that the structure of growth may change according to length of time since the traumatic event.

A secondary issue that may relate to the differences in the factor structure between this study and that of McBride et al. (in press) is culture. Although the Netherlands and Ireland are similar in many respects (e.g. northern European countries), there may be other unknown factors influencing the process of adversarial growth in these two European countries. For example, Brennan (2001) noted that socio-cultural environment could be an important determinant of the nature of positive changes experienced following a diagnosis of cancer. This being noted, however, the authors feel that it is unlikely that the translation of the SLQ-38 into Dutch and its use in a different culture contributed to the emergence of a different factor structure in the current study. Evidence in support of this notion is derived from a recent study that successfully translated the well-known PTGI into Dutch and replicated a factor structure somewhat similar to the original instrument (Jaarsma et al., 2006). Thus, as previous highlighted, it would appear that it is the characteristics of the respondents, and type of event experienced by those individuals, that appears to have the greatest influence on the structure of adversarial growth.

A third noteworthy point is that the two studies used different statistical approaches. Specifically, McBride et al. (in press) utilised a split sample technique to conduct EFA to initially assess the factor structure of the SLQ-38 and subsequently cross-validated this solution using CFA. Although this approach was appropriate when the factor structure of

this scale was first being identified, the current study employed a more robust and sophisticated pure CFA approach in order to test a priori structure based on previous research. This use of this methodology has been acknowledged as the way forward within this field (Joseph et al. 2005; Park & Helgeson, 2006).

The main result from this study demonstrated that, in the current sample at least, 16 items of the SLQ-38 can be represented as three subscales or first-order factors (enhanced personal relationships, changes in life philosophy and changes within the self) that load on a higher-order general adversarial growth factor. This finding supports research that has demonstrated that although three distinct dimensions of adversarial growth can be distinguished empirically and theoretically, at a higher level of abstraction, they all appear to tap the same underlying phenomenon (Joseph & Linley, 2006; Joseph et al., 2005). An instrument such as the 16-item Silver Lining Questionnaire (SLQ-16) may prove useful for investigators and clinicians alike because it would allow for the measurement of adversarial growth in three specific domains, as well as the obtainment of a single general measure of adversarial growth. In different circumstances, both types of information could be useful. For example, when the main research aim is to assess the effectiveness of interventions designed to promote growth in a specific area, a continuous score on a particular sub-scale may be most useful. Alternatively, the objective of the research investigation should be to test the hypothesised predictors of growth following illness, calculating and using an overall score of adversarial growth might be appropriate as well.

The current study revealed only weak associations between specific demographic (i.e. age) and illness-related (i.e. stage of disease) variables and total and subscale scores of the SLQ-16. These findings may be, at least partly, attributable to the lengthy time elapse (8 years) between times since diagnosis and questionnaire completion. The results of the MANOVA revealed that scores on the general adversarial growth factor or the three-subscales did not differ in relation to the socio-demographic or illness-related variables. This finding is expected. Although Tedeschi and Calhoun (1995) proposed that there are several socio-demographic determinants of adversarial growth (e.g. gender, severity of event), research investigating the roles played by socio-demographic or illness-related variables in the lives of the chronically ill, has failed to produce consistent findings (Thornton, 2002). The current findings concur with previous research (Lechner et al., 2003) that has demonstrated that socio-demographic variables such as gender, education and marital status are unrelated to adversarial growth in cancer patients. One may have expected to find significant relationships between illness-specific variables, and in particular stage of disease, and the level of adversarial growth experienced. As previously mentioned, it has been proposed that when illness uncertainty is greatest, as is typical in intermediate stages of cancer (e.g. stage II or III), individuals may engage more proactively in benefit finding. For example, Urcuyo, Boyers, Carver and Antoni (2005) discovered a significant weak negative association between higher stages of disease and the occurrence of benefit finding. Lechner et al. (2005) discovered a quadratic relationship between stage of disease and benefit finding: stages I and IV had the lowest, and stage II had the highest, levels of benefit findings. A noteworthy finding in the current study is the failure to find a significant association between type of treatment for cancer and the level of adversarial growth experienced. Previous research has proposed that more unpleasant or invasive types of treatment for cancer may act as a driving force for patients to experience adversarial growth (Lechner et al., 2003). The present findings did not uncover such an association and to date, there is relatively little evidence in support of this hypothesis. This being noted, however, Urcuyo et al. (2005) discovered a weak significant association between benefit finding and anti-hormonal cancer treatment. Thus, this may be an

important area for future research. Indeed, it is clear that further investigation is necessary to generally determine the affects that socio-demographic and illness-related variables have on the reporting of adversarial growth following illness.

A major strength of this study is that applied a robust hypothesis testing approach to provide further empirical support for the dimensionality of adversarial growth and the factor structure of a generic instrument designed to measure this phenomenon in the lives of the chronically ill. Nevertheless, it must be noted that in order for the SLQ-16 to be an important and useful instrument within the field, the current findings need to be replicated, using similar rigorous statistical techniques, in other illness groups. Although one of the strengths of this study was the use of a relatively large sample of cancer patients who were all at a similar stage since diagnosis (i.e. 8 years), the fact remains that most of the participants were female and diagnosed with breast cancer with a relatively good prognosis. The composition of the current sample may limit the generalizability of the findings. It must also be reiterated that this sample completed the SLQ-38 eight years post-diagnosis. Based on our findings, we cannot draw firm conclusions about the stability of the factor structure in other illness groups, be it cancer survivors or otherwise, who have experienced a shorter time frame between diagnosis and questionnaire completion. Notwithstanding these limitations, it should be noted that the items of the original SLQ-38 were constructed using qualitative data from individuals who had suffered a variety of chronic illnesses. Thus, in order to further explore the generalizability of this revised instrument, the use of the SLQ-16 with other illness groups, including illness groups at various different phases in the illness recovery process, is now encouraged.

It is clear that once it has been established that the SLQ-16 is a valid instrument to measure growth in cancer patients, and that it can generalise across other illness groups and time, researchers will be able to examine the possible mechanisms that contribute to individual differences in the reporting of growth. In the future, the SLQ-16 may also prove a useful tool in assessing the effectiveness of therapeutic interventions that are designed to help cultivate adversarial growth in the lives of people with illness.

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